

i : 2 to the quantity of hydrogen evolved at the cathode. To obtain this result, I made use of an acid containing 20 times its volume of water; I found, however, that an -acid containing 400 times its volume of water still shows the phenomenon in a very obvious manner. But I must repeat it, the indispensable condition for causing the evolution of the oxygen at the iron wire is to close the circuit exactly in the same manner as above mentioned. For if, *exempli gratia*, the circuit be closed with the negative platina wire, not one single bubble of oxygen gas makes its appearance at the positive iron; neither is oxygen given out at it, when the circuit is closed, by plunging first one end of the iron wire into the nitric acid, and by afterwards putting its other end in connection with the positive pole of the pile. In both cases a nitrate of iron is formed, even in an acid containing 400 times its volume of water; which salt may be easily observed descending from the iron wire in the shape of brownish-yellow-coloured streaks.

I have still to state the remarkable fact, that if the evolution of oxygen at the anode be ever so rapidly going on, and the iron wire made to touch the negative electrode within the acid, the disengagement of oxygen is discontinued, not only during the time of contact of the wires, but after the electrodes have been separated from each other. A few moments holding the iron wire out of the acid is, however, sufficient to recommunicate to it the property of letting oxygen gas evolve at its surface. By the same method the wire acquires its evolving power again, whatever may have been the cause of its loss. The evolution of oxygen also takes place in dilute sulphuric and phosphoric acids, provided, however, the circuit be closed in the manner above described. It is worthy of remark, that the disengagement of oxygen at the iron in the last-named acids is much easier stopped, and much more difficult to be caused again, than is the case in nitric acid. In an aqueous solution of caustic potash oxygen is evolved at the positive iron, in whatever manner the circuit may be closed; but no such disengagement takes place in aqueous solutions of hydracids, chlorides, bromides, iodides, fluorides. The oxygen, resulting in these cases from the decomposition of water, and the anion (chlorine,

bromine, etc.) of the
other electrolyte decomposed combine
at the same time with
the iron.

To generalise these facts, it may be
said that independently
of the manner of closing the circuit,
oxygen is always disengaged
at the positive iron, provided the
aqueous fluid in which it is